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GENETICS.—*The chromosomes of Citrus.*[1] HOWARD B. FROST, Citrus Experiment Station, Riverside, California (Communicated by W. T. SWINGLE).

Many of the "bud variations" of Citrus[2] probably result from a chimeral constitution of the tree producing the variation. It may be assumed, however, that bud-variation types originate primarily through either gene (point) mutation or chromosomal mutation (chromosome aberration). In the investigation of the nature of somatic hereditary variations of Citrus, therefore, determinations of chromosome number are necessary. They are also of interest in relation to the great variability of F_1 hybrids between species,[3] although I consider it probable that this variability is mainly due to extensive heterozygosis of the parent forms.

Strasburger[4] examined pollen mother cells and stem tips of sweet orange ("Apfelsine;" *C. sinensis* Osbeck), sour orange ("Pomaranze;" *C. aurantium* L.), citron ("Cedrate"; *C. medica* L.), and a "bizzarria" form which was doubtless a mixed chimera, the components being citron and sour orange. He states that the pollen mother cells have 8 pairs of chromosomes, diakinesis being the most favorable stage for counting, and that "mit grosser Wahrscheinlichkeit" the very small

[1] Paper No. 121, University of California, Graduate School of Tropical Agriculture and Citrus Experiment Station, Riverside, California.

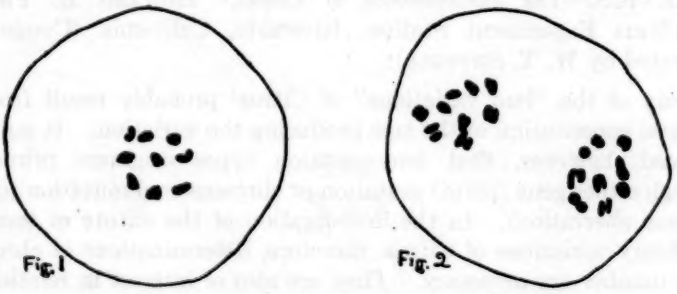
[2] A. D. SHAMEL, L. B. SCOTT, and C. S. POMEROY. *Citrus-fruit improvement: a study of bud variation in the Washington navel orange.* U. S. Dept. Agr. Bull. 623. 146 p., *19 pls., 16 figs.* 1918. Also: Dept. Bulls. 624 and 697 (1918); 813 and 815 (1920).

[3] WALTER T. SWINGLE. *Variation in first-generation hybrids (imperfect dominance); its possible explanation through zygotaxis.* Conf. Internat. Génétique, IV^e^. Compt. Rend., p. 381–394, *10 figs.*

[4] EDUARD STRASBURGER. *Über die Individualität der Chromosomen und die Pfropfhybriden-Frage.* Jahrb. f. wissensch. Bot. **44**: 482–555. *3 pls., 1 fig.* 1907.

stem-tip cells have 16 chromosomes. Osawa[5] reports for "unshu" (satsuma; *C. nobilis* var. *unshiu* (Lour.) Swingle) that the number of pairs in pollen mother cells at diakinesis and at the first metaphase is probably 8, and that the somatic number is "more than 14, probably 16." Evidently neither Strasburger nor Osawa secured very clear metaphase figures. No other determinations of chromosome number for Citrus seem to have been published.

During the blooming season of 1924, pollen mother cells of several commercial varieties of Citrus were stained by the present writer, using Belling's[6] iron-acetocarmine method (No. 2). This method probably gives better fixation than has previously been secured; in good material it gives some metaphase views in which every chromo-



APOGAMIC PROGENY OF MEDITERRANEAN SWEET ORANGE

Fig. 1.—Metaphase of first meiotic division; 9 bivalent chromosomes. Fig. 2.—Same as figure 1, at second metaphase; 9 univalent chromosomes in each group; some chromosomes distinctly split, but the halves always very close together.

some is well separated from its neighbors. Normal spore tetrads are very uniformly produced. Polyspory and polycary have not been observed.

The first count secured (at the metaphase of the first meiotic division) showed 9 separate chromosomes. Further study showed that 9 is the normal number of pairs in two varieties of sweet orange (*C. sinensis* Osbeck), namely, Mediterranean Sweet and Paper Rind (St. Michael), and in the variety of grapefruit (*C. maxima* (Burm.) Merrill) called Imperial. This conclusion depends on a few counts at diakinesis, where poorer staining and irregular position made count-

[5] I. OSAWA. *Cytological and experimental studies in Citrus.* Imp. Univ. Tokyo. Coll. Agr. Jour. **4**: 83–116. *5 pls., 1 fig.* 1912.

[6] JOHN BELLING. *On counting chromosomes in pollen mother cells.* Am. Nat. **55**: 573–574. 1921.

ing relatively difficult, a few counts at the first or second anaphase, and more numerous counts at the first metaphase (fig. 1)[7] and the second metaphase (fig. 2).

As Strasburger's[4] figures indicate, the chromosomes are very small. Dark granules, sometimes resembling the chromosomes, were often troublesome, and spoiled some preparations, but some metaphase groups were individually decisive. With Mediterranean Sweet (that is, one of the apogamic progeny from a species cross in which this variety was seed parent), the case was finally put beyond the possibility of reasonable doubt. The chromosomes in two groups of pollen mother cells at the second division were countable in a large proportion of the cases, and 24 positive counts of 9 chromosomes were made here; in four of these cells, both groups were countable and each group consisted of 9 chromosomes. The few apparent counts of 8 in these groups were plainly to be classed with those of still smaller numbers; that is, they obviously were cases where not all the chromosomes of the normal complement were distinguishable. It is also significant that apparent counts of 10 are rare.

Since three varieties of Citrus have been found to have 9 pairs of chromosomes, and two of these varieties belong to one of the species which Strasburger studied, it seems probable that 9, not 8, is the usual haploid number in Citrus. At least, it is certain that the number is not uniformly 8.

BOTANY.—*New plants from Central America.*[1] PAUL C. STANDLEY, U. S. National Museum.

In the course of work recently begun upon a flora of the Panama Canal Zone, several new species have been detected, and descriptions of them are published here. Two of the species described were recognized a few years ago by the late Prof. W. W. Rowlee, while revising the Scitaminales for the proposed Flora of Central America.

Most of the species here described belong to the large family Rubiaceae, and particularly to the genus *Hoffmannia*. This genus finds its greatest development in Mexico and Central America, and consists of a large number of species, most of which seem to be extremely local in their distribution.

[7] The figures were drawn with the aid of a camera lucida, at a magnification of about 3065 diameters, and are reduced one-fourth in reproduction.

[1] Published by permission of the Secretary of the Smithsonian Institution.

Calathea hirsuta Standl., sp. nov.

Plants 0.5 to 1 meter high; leaves all basal, long-petiolate, the sheaths 15–20 cm. long, membranaceous, densely short-hirsute, the petioles 3 cm. long or less, hirsute, the blades oblanceolate-oblong to oval, 19–41 cm. long, 11–12.5 cm. wide, rounded or broadly cuneate at base, abruptly short-acuminate at apex, thin, green, sparsely short-pilose above or glabrate, beneath soft-pilose or in age glabrate; scape 54–66 cm. long, slender, hirsute; spike 6–12 cm. long, 1–2 cm. thick, the bracts 4 or 5, spirally imbricate, rather lax, broad, thin, 2.5–4 cm. long, acute to rounded and apiculate at apex, densely hirsute; corolla glabrous, exserted 2–3 cm. beyond the bracts.

Type in the U. S. National Herbarium, no. 1,165,835, collected at Alajuela, Panama, August 18, 1923, by F. L. Stevens (no. 1131). Also collected in damp woods on Ancón Hill, Canal Zone in 1923, *Standley* 25163.

A very distinct species, not closely related to any other known from Central America.

Calathea panamensis Rowlee, sp. nov.

Plants small, 20–40 cm. high, with few or numerous, erect or spreading basal leaves; petioles 8–16 cm. long, sheathed for nearly their whole length, minutely pilose or glabrate; leaf blades obovate to oval, 11–20 cm. long, 5–10 cm. wide, rounded and abruptly short-acuminate or apiculate at apex, rounded or obtuse at base, thin, glabrous above except along the puberulent costa, puberulent beneath; peduncles one or several, 3.5 cm. long or less, the spikes sometimes sessile; bracts numerous, the outer ones ovate to lance-oblong, 4–7 cm. long, membranaceous, acute or acuminate, sparsely short-pilose; corolla yellow, equaling or exceeding the bracts, the segments sericeous outside.

Type in the U. S. National Herbarium, no. 863124, collected in deep woods near Juan Díaz, Province of Panama, Panama, near sea level, Sept. 30, 1917, by Ellsworth P. Killip (no. 3078). The following additional specimens represent the same species:

Panama: Near Tapia River, edge of forest, *Maxon & Harvey* 6664. Matías Hernández, *Pittier* 6806. Chepo, Province of Panama, *Pittier* 4564.

Costa Rica: Matambú, Nicoya Peninsula, alt. 600 m., *Cook & Doyle* 710.

Myrosma panamensis Standl., sp. nov.

Plants acaulescent, small, usually 30–40 cm. high, with few or numerous basal leaves; petioles 12–18 cm. long, with broad green sheaths nearly their whole length, glabrate; leaf blades elliptic or oval, 16–30 cm. long, 7–13 cm. wide, obtuse or acute at apex, rounded or broadly cuneate at base, thin, glabrous above except along the puberulent costa, beneath slightly paler, thinly short-pilose or puberulent; scapes equaling or shorter than the petioles, bearing at apex a large long-petiolate leaf; racemes 2–4 from the axil of the leaf, 4–6 cm. long, on peduncles 1.5–4 cm. long; bracts numerous, lax, spreading, rather remote, broadly ovate, about 2 cm. long, obtuse, scarious, glabrous; sepals oblong-lanceolate, 1 cm. long; ovary glabrous.

Type in the U. S. National Herbarium, no. 1,153,506, collected in wet forest along the Río Tapia, Province of Panama, Panama, near sea level, December, 1923, by Paul C. Standley (no. 26219). The following additional collections belong here:

PANAMA: Río Tecumen, *Standley* 26738. Near the big swamp east of Río Tecumen, *Standley* 26608. Along the Corozal Road, near Panama, *Standley* 26845.

Pleiostachya pittieri Rowlee, sp. nov.

Plants a meter high or more; petioles about 75 cm. long, glabrous, the callus terete, glabrous, 4 cm. long, with a distinct collar at its junction with the petiole; leaf blades elliptic, about 45 cm. long and 15 cm. wide, green and glabrous on both sides, acute at each end; spikes 2, sessile, linear, 15–19 cm. long, 1.3 cm. wide, slightly compressed; bracts ovate, 2.2 cm. long, acute, coriaceous, closely appressed, glabrous; flowers white, exserted; spikes subtended by a large petiolate leaf and by an obtuse oblong bract 3 cm. long inserted opposite the leaf.

Type in the U. S. National Herbarium, no. 679566, collected on hills of Sperdi, Puerto Obaldía, San Blas Coast, Panama, altitude 200 meters or less, September, 1911, by H. Pittier (no. 4409).

Pleiostachya pruinosa (Regel) Schum., the only similar species, differs in its usually pedunculate, broader, more compressed spikes, with larger thinner bracts, and in the dark red lower surface of the leaves.

Aristolochia panamensis Standl., sp. nov.

Stems erect or decumbent, simple, 30–100 cm. high, stout, the young branches densely pilose with short subappressed hairs; petioles stout, about 1 cm. long; leaf blades obovate-oval to oblong-obovate, 9–21 cm. long, 5–12 cm. wide, acute to rounded at apex, acute at base, thick, pinnate-nerved, glabrous above, beneath very glaucous, finely soft-pubescent, the venation prominent-reticulate; flowers borne near the base of the stem; peduncles slender, simple, in fruit 3–6 cm. long; calyx about 3.5 cm. long, densely pilose, the basal portion narrow, the throat inflated into a large sac 1.8 cm. broad, the limb apparently broadly ovate and acuminate; capsule oval, about 3 cm. long and 1.5 cm. in diameter, 6-celled, tomentose or glabrate, 6-costate.

Type in the U. S. National Herbarium, no. 1,154,510, collected in moist forest along the Río Paraíso, above East Paraíso, Canal Zone, Panama, Jan. 7, 1924, by Paul C. Standley (no. 29906). The following additional specimens belong here:

PANAMA: Vicinity of San Felix, eastern Chiriquí, alt. 120 meters or less, *Pittier* 5463, 5750. Río Pedro Miguel, Canal Zone, *Standley* 29950. Las Cascadas Plantation, Canal Zone, *Standley* 25740, 29515.

The plant is abundant locally in wet forests about the Canal Zone. It is quite unlike any of the other Central American species.

Aristolochia sylvicola Standl., sp. nov.

Stems very slender, scandent, glabrous; petioles slender, glabrous, 6–8 cm. long; leaf blades broadly rounded-deltoid, 12–17 cm. long, 10–15 cm. wide, acuminate or somewhat abruptly acute, at base subcordate or subtruncate, thin, dark green and glabrous above, beneath glaucescent and thinly puberulent, palmately 5-nerved; inflorescence 4-flowered, borne on the naked corky-angled stems, glabrous, the pedicels about 6 mm. long; immature capsules oblong, 6-angled, 3 cm. long, glaucescent, glabrous.

Type in the U. S. National Herbarium, no. 1,153,853, collected in wet forest on hills north of Frijoles, Canal Zone, Panama, Dec. 19, 1923, by Paul C. Standley (no. 27469).

The stems were tightly wrapped about the trunk of a large tree. Only one plant was found. Although without flowers, the plant is so distinct from all known Central American species of *Aristolochia* that it seems best to describe it as new.

Calderonia klugei Standl., sp. nov.

Tree; young branchlets sparsely hispid with short hairs; stipules triangular-ovate, 7 mm. long, brown, puberulent outside along the costa; petioles about 3 mm. long, hispid; leaf blades broadly ovate, 4–6.5 cm. long, 2–4.5 cm. wide, narrowed to the obtuse apex, usually deeply cordate at base, glabrous above, hispidulous beneath along the costa; capsule subglobose, 2.5–3 cm. long, glabrate, 2-celled, loculicidally bivalvate; seeds numerous, horizontal, semiorbicular, strongly compressed, winged at one end, the seed with its wing 2.5 cm. long.

Type in the U. S. National Herbarium, no. 1,206,424, collected near Chepo, Province of Panama, Panama, in 1924, by H. C. Kluge (no. 19).

The type material forms part of a small but interesting collection of timber trees obtained by Mr. Kluge in the neighborhood of Chepo. The collector states that this tree does not reach a great size and that it grows usually on overflowed land. The vernacular name is "palo colorado."

The flowers are not at hand, and when they are collected it may be found that the tree belongs to some other genus, but the fruit is so distinctive that it seems probable that it belongs to the genus *Calderonia*, recently described[2] from Salvador. *Calderonia salvadorensis* is distinguished from the Panama tree by its large leaves, rounded or obtuse at base.

Manettia estrellae Standl., sp. nov.

Suffrutescent or woody vine, the stems villosulous; stipules 1–1.5 mm. long, dentate; petioles 3–24 mm. long, villosulous; leaf blades ovate to oblong-elliptic, 3.5–6.5 cm. long, 1.5–3 cm. wide, acute, obtuse or acute at base, thin, villosulous on both surfaces, more densely so beneath; cymes axillary, few-flowered, pedunculate, the pedicels stout, 2.4 mm. long, villosulous; hypanthum densely short-villous, the 4 calyx lobes oblong-oblanceolate, foliaceous, 4–5 mm. long, acute; corolla pinkish white, thinly villous outside, the slender tube 1 cm. long, the lobes of about the same length; capsule obovoid, 5 mm. long.

Type in the U. S. National Herbarium, no. 1,153,146, collected in wet forest, La Estrella, Province of Cartago, Costa Rica, March 27, 1924, by Paul C. Standley (no. 39224). No. 39425 from the same locality is of this species.

Among the North American species this is easily recognized by the copious pubescence upon all parts of the plant.

[2] This JOURNAL 13: 290. 1923.

Hamelia storkii Standl., sp. nov.

Branches glabrous; stipules subulate from a narrowly triangular base, 10–12 mm. long, ciliate; leaves opposite, the petioles 1.5–5 cm. long, glabrous; leaf blades elliptic, 12–22 cm. long, 4–9 cm. wide, acuminate, acute at base, sparsely barbate beneath in the axils of the lateral nerves, elsewhere glabrous; inflorescence terminal, the branches often 10 cm. long in age, glabrous, many-flowered, the flowers secund, sessile or nearly so; calyx glabrous, the lobes triangular-oblong, 1.5 mm. long, obtuse, longer than broad, erect; corolla yellow, 2.5–3 cm. long, tubular, slightly widened above, the throat 4 mm. broad; fruit oblong, 1 cm. long, 3 mm. thick.

Type in the U. S. National Herbarium, no. 1,166,466, collected in western Panama, August 1, 1923, by H. E. Stork (no. 38). Also collected in the Changuinola Valley, Panama, Jan. 14, 1924, by V. C. Dunlap (no. 326).

Related to *H. calycosa* Donn. Smith, of Guatemala, which has smaller, mostly ternate leaves, a few-flowered inflorescence, and smaller corolla, besides much larger calyx lobes.

Hamelia rowleei Standl., sp. nov.

Branches thinly pilose with long spreading hairs; stipules subulate, about 1 cm. long; leaves opposite, the petioles 1.5–4.5 cm. long, sparsely pilose; leaf blades elliptic-obovate, 15–19 cm. long, 7–8 cm. wide, abruptly short-acuminate, cuneate-attenuate at base, villosulous above along the costa but elsewhere glabrous, beneath copiously pilose with stiff spreading hairs; inflorescence terminal, many-flowered, the branches pilose, the flowers secund, sessile or nearly so; calyx pilose, the lobes deltoid, about as broad as long, 1.5 mm. long; corolla tube puberulent, 28 mm. long, 5 mm. wide above the base, the lobes broadly ovate, spreading.

Type in the U. S. National Herbarium, no. 1,080,249, collected at Livingston, on the Reventazón River, Costa Rica, in 1920, by W. W. Rowlee and H. E. Stork (no. 75).

Probably related to *H. magniloba* Wernham, of Nicaragua, which has smaller flowers and nearly glabrous leaves.

Hoffmannia asclepiadea Standl., sp. nov.

Stems simple, herbaceous, green, 1.5 meters high, villosulous; leaves opposite, the petioles stout, 2.5–4 cm. long, villosulous; leaf blades ovate-elliptic, about 20 cm. long and 8 cm. wide, long-acuminate, cuneate at base, glabrous above, copiously short-villous beneath, especially along the nerves; cymes sessile, shorter than the petioles, many-flowered, the branches densely short-villous; calyx short-villous, the lobes ovate-deltoid, obtuse, 1 mm. long; corolla ovoid and acutish in bud, greenish yellow, densely short-villous.

Type in the U. S. National Herbarium, no. 1,153,122, collected in wet forest at Las Nubes, Province of San José, Costa Rica, altitude about 1,900 meters, March 20–22, 1924, by Paul C. Standley (no. 38349).

Among the Costa Rican species this is well marked by the copious pubescence.

Hoffmannia amplexifolia Standl., sp. nov.

Stems simple, herbaceous, glabrous, sharply quadrangular, 1–1.5 meters high; leaves ternate, sessile, oblanceolate or oblong-obovate, 23–35 cm. long and 8–13 cm. wide or larger, long-acuminate, long-attenuate to the deeply cordate, clasping base, glabrous above, beneath minutely puberulent along the nerves; cymes clustered in the leaf axils, many-flowered, 3–8 cm. long, the branches densely villosulous, the flowers slender-pedicellate; calyx reddish, short-villous, the lobes narrowly triangular, obtuse; corolla greenish yellow, puberulent or villosulous, in bud 5 mm. long, the lobes longer than the tube; fruit red.

Type in the U. S. National Herbarium, no. 1,153,192, collected in moist forest near Orosi, Province of Cartago, Costa Rica, March 30, 1924, by Paul C. Standley (no. 39869). Nos. 39717 and 39809, from the same locality are also of this species.

Readily distinguished from other species of the genus by the clasping bases of the leaves.

Hoffmannia josefina Standl., sp. nov.

Shrub 3 meters high, with few branches, the stems terete, glabrous; leaves opposite, the stout glabrous petioles 1–1.5 cm. long; leaf blades obovate or oblong-obovate, 13–22 cm. long, 5.5–9 cm. wide, acute or abruptly short-acuminate, cuneate-attenuate at base, glabrous; cymes few or many-flowered, pedunculate, longer than the petioles, the branches glabrous, the pedicels 1–3 mm. long; calyx glabrous or with a few short scattered hairs, the limb 2 mm. long, the lobes narrowly triangular, acute, green; corolla in bud ovoid, acute, in anthesis 11 mm. long, glabrous, the lobes shorter than the tube; fruit subglobose, 6 mm. long, dark red.

Type in the U. S. National Herbarium, no. 1,152,900, collected in moist forest between Aserrí and Tarbaca, Province of San José, Costa Rica, altitude about 1800 meters, February 12, 1924, by Paul C. Standley (no. 34143).

Hoffmannia hamelioides Standl.,sp. nov.

Shrub 1.5 meters high, the branches glabrous; leaves opposite, the petioles stout, 1–3 cm. long, sparsely puberulent or glabrous; leaf blades obovate-elliptic or oblancolate-elliptic, 12–21 cm. long, 4.5–7 cm. wide, abruptly acuminate, cuneate-decurrent at base, glabrous above, villosulous beneath along the nerves; cymes sessile, few or many-flowered, about equaling the petioles, the branches short-villous; calyx short-villous, the lobes 1–1.5 mm. long, narrowly triangular, acutish; corolla in bud ovoid, acutish, 4 mm. long, greenish white, short-villous; fruit dark red, 7–8 mm. long.

Type in the U. S. National Herbarium, no. 1,152,904, collected in moist forest between Aserrí and Tarbaca, Province of San José, Costa Rica, altitude about 1,800 meters, February 12, 1924, by Paul C. Standley (no. 34149).

Related to *H. josefina*, but distinguished by the pubescence of leaves and inflorescence.

Hoffmannia macrophylla Standl., sp. nov.

Shrub 3 meters high, with few branches, glabrous throughout, the stems green; leaves sessile or nearly so, the blades decurrent to the base, oblong-obovate, 21–35 cm. long, 8–10 cm. wide, abruptly acute, long-attenuate to the base, bright green; cymes sessile or pedunculate, 3–4 cm. long, laxly few-flowered, the pedicels 3–8 mm. long; calyx red, the limb shallowly lobate, the lobes rounded-deltoid, 1.5 mm. long; corolla in bud cylindric, obtuse, 6 mm. long, red outside, the lobes yellow, twice as long as the tube.

Type in the U. S. National Herbarium, nos. 1,152,957–8 (from the same plant), collected in wet forest, Cerro de la Carpintera, Province of Cartago, Costa Rica, altitude about 1700 meters, February, 1924, by Paul C. Standley (no. 35636).

Hoffmannia leucocarpa Standl., sp. nov.

Shrub about 2 meters high, simple or with few branches, glabrous throughout; leaves opposite, the petioles stout, 3–5.5 cm. long, the blades elliptic or lance-elliptic, 15–24 cm. long, 6–12 cm. wide, acuminate, acute or cuneate at base; cymes axillary, equaling or often much exceeding the petioles, laxly few-flowered, the flowers on slender pedicels 5–12 mm. long, the branches bright red; calyx limb 2–3 mm. long, red, the lobes deltoid, acute; corolla red, in bud 7 mm. long and acute, the lobes longer than the tube; fruit subglobose, about 1 cm. long, white.

Type in the U. S. National Herbarium, no. 1,153,121, collected in wet forest at Las Nubes, Province of San José, Costa Rica, altitude about 1600 meters, March 20–22, 1924, by Paul C. Standley (no. 38340). No. 38703 from the same locality belongs to this species.

Hoffmannia pallidiflora Standl., sp. nov.

Shrub 1–2 meters high, with simple quadrangular glabrous stems; leaves opposite, the slender petioles 2–4 cm. long, glabrous, the upper leaves often sessile; leaf blades elliptic or obovate-elliptic, 15–25 cm. long, 7–9 cm. wide, acuminate, abruptly long-decurrent, glabrous; cymes few-flowered, long-pedunculate, equaling the petioles, the branches glabrous, the flowers partly sessile and partly pedicellate; calyx pale green, the lobes triangular, obtuse or acute, 1–1.5 mm. long; corolla pale green, narrow and acute in bud, in anthesis 8 mm. long, the lobes nearly twice as long as the tube; fruit oval, red, 1 cm. long.

Type in the U. S. National Herbarium, no. 1,153,101, collected in wet forest at La Hondura, Province of San José, Costa Rica, altitude about 1500 meters, March 16, 1924, by Paul C. Standley (no. 37877). The following collections also belong here:

COSTA RICA: La Hondura, *Standley* 37780, 37837. El Muñeco, south of Navarro, Province of Cartago, alt. about 1400 meters, *Standley* 33435, 33951.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

WASHINGTON ACADEMY OF SCIENCES

181ST MEETING

The 181st meeting of the Academy was held in the Assembly Hall of the Cosmos Club the evening of Thursday, November 15, 1923, and was devoted to a consideration of Pan-Pacific problems. The program was as follows:

J. C. MERRIAM: *The origin and development of the Pan-Pacific Scientific Congress.*

T. WAYLAND VAUGHAN: *The Australian Meeting in 1923: The Scientific Proceedings.*

Dr. Vaughan, in reporting for Col. Alfred H. Brooks and himself as delegates from the Academy, spoke in general of the cordial hospitality with which the delegates were received by the Commonwealth Government, the financial and other assistance rendered by the Government, the success of the meetings, and in some detail of the fields covered by the general and sectional meetings. There were present 81 official delegates, as follows: Great Britain, 12; United States, 17; Canada, 3; Hawaii, 6; New Zealand, 13; Japan, 10; Philippine Islands, 5; Netherlands, 6; British Malaya, 2; Tahiti, 1; Papua, 1; New Guinea, 1; Fiji, 1; Hongkong, 1; France, 1; Chile, 1. The Congress was officially opened in Melbourne, August 13, by an address from the Governor-General. The Sydney sessions were opened August 24. The President of the Congress, Sir David Orme Masson, Professor of Chemistry at the University of Melbourne, presided over the general sessions at Melbourne, which were limited to opening and closing meetings. The Vice-president of the Congress, Sir Edgeworth David, Professor of Geology at the University of Sydney, presided over the general session at Sydney, which were mostly devoted to subjects of general interest to several sections. These were as follows: *The structure of the Pacific region and its influence on animal and plant life; Organization and coordination of scientific work in the Pacific region; Insects, their distribution and role in the Pacific region; Climate of the Pacific region, its causes and relations to economic and social life; Settlement in areas of low rainfall.*

The sections of the Congress were Agriculture, Anthropology and Ethnology, Botany, Entomology, Forestry, Geodesy and Geophysics (including Radiotelegraphy), Geography and Oceanography, Geology, Hygiene, Veterinary Science, and Zoology. In addition to the technical discussions, arrangements were made for several popular public lectures in both Melbourne and Sydney. Outlines of the programs of the sections are as follows:

Agriculture.—(1) Problems relating to irrigation; (2) Agricultural education and research; (3) Genetics and the improvement of farm animals; (4) Diseases of wheat; (5) Soil surveys; (6) Genetics and the improvement of crops; (7) Diseases of cereals; (8) Diseases of miscellaneous crops; (9) Tropical agriculture; (10) Plant quarantine regulations.

Anthropology and Ethnology.—(1) Cartography of the Pacific (joint meeting with sections of Geodesy and Geography); (2) Organization of research among the natives of Australia and the islands of the Pacific, and Linguistic problems of the Pacific; (3) Decline in native population in the islands of the Pacific, and Variations in sex ratios in relation to the index of declining fertility; (4) The Australian aboriginal—his origin and his re-

lations to the Tasmanian and other races; (5) The relation of Melanesian, Polynesian, and Indonesian peoples and languages; (6) Migration zones.

Botany.—(1) Forests of Victoria, and the big trees of Australia; (2) Ecologic studies in Tasmania, and the flora of Krakatau; (3) Antipodean shortage of softwoods (with Forestry Section); (4) Wheat diseases (with Agricultural Section); (5) Distribution of plants, Australia's influence on adjacent floras, and Distribution of orchids; (6) So-called back-mutations and plant ecology in arid regions; (7) Gymnosperms of the Pacific; (8) Evolution of plant life in the Pacific; (9) General botany, especially the phytogeography, of the Pacific.

Entomology.—(1) Parasitologic problems in veterinary science and zoology; The buffalo fly (joint meeting with sections of Zoology and Veterinary Science); (2) Introduced pests and natural enemies (joint meeting with sections of Zoology, Botany, and Forestry); (3) Introduction of beneficial insects into New Zealand, Distribution of anopheline mosquitoes, and The termite problem as affecting Australia; (4) The Mediterranean fruit-fly, Fruit-fly control, and Australian fruit-flies; (5) Control of noxious insects by the introduction of their natural enemies, and Entomological control of the prickly pear; (6) Control of the blow-fly pest; (7) Distribution of insects in relation to disease (jointly with other sections).

Forestry.—The first three of the four sessions of this Section were devoted to joint discussions with the sections of Botany, Entomology, and Zoology. At the fourth session the topics were: Seasoning of hardwood timber, The need for research into the properties of hardwood timbers. At Sydney the topics were: Timber-boring insects, with special reference to the exportation of Philippine lumber; Re-afforestation in the Pacific; A national forestry school and the properties of hardwood timber; Introduced tropical borers and their natural enemies; Plant quarantine (jointly with the sections of Agriculture and Entomology).

Geodesy, Geophysics, and Radiotelegraphy.—(1) Present condition of mapping in the Pacific, and A geodetic survey of Australia; (2) Determination of gravity at sea, Isostasy in the light of the work in India, Earth-tides, Australia's possible contribution to knowledge of the figure of the Earth; (3) Meteorology of the Pacific, and International researches in solar physics; (4) Studies of terrestrial magnetism in the Pacific region, and The magnetic observatory of the Carnegie Institution at Watheroo; (5) Geodetic and trigonometric surveys and their status in New South Wales and the Netherlands East Indies; (6) Gravity determinations in the Philippines, Development of the hypothesis of isostasy, Limiting depth of earthquake foci, Methods of geodetic work; (7) Tropical storms and associated phenomena; (8) Location of earthquakes and the installation of seismographs and related matters; (9) Microseisms and their correlation with the distribution of atmospheric pressure; (10) Engineering and architectural construction in countries of high seismicity; (11) Earthquake forecasting; (12) Radiotelegraphy (three half-day discussions on ten topics, among them the organization of wireless time signals in the Pacific and adjoining countries).

Geography and Oceangraphy.—(1) Mapping of the Pacific, and related matters (jointly with the sections of Anthropology and Geodesy); (1) Hydrographic surveys in Australia, and An oceanographic institute in Australia; (3) Meteorology of the Pacific (jointly with section of Geodesy and Geophysics); (4) Oceanography, Ocean currents of the southwest Pacific; (5) Unexplored regions of the Pacific, especially in Melanesia; (6) Geographic education; (7) Physiographic unity of the Pacific (jointly with the section of Geology).

Geology.—There had been selected for the Section of Geology eight topics, and in the discussion of each of them an endeavor was made to cover the Pacific region. The different topics interlocked in scope, so that they were mutually supplementary and taken all together a good general account of many of the important geologic features of the Pacific region was the result. The topics were (1) Correlation of the Cenozoic formations; (2) The ore provinces; (3) The geologic structure; (4) Post-Mesozoic volcanic activity; (5) Carboniferous and Permian; (6) Coral reefs; (7) Oil and water resources; (8) Coal resources and status of a real geologic mapping.

Hygiene.—(1) Mining hygiene; (2) Program of hygiene for the Pacific region; (3) Control of plague, small-pox, and other diseases among native races, and cooperation in public health matters; (4) Causes of the decline of native races; (5) Climate and human efficiency; (6) Insects and the distribution of disease by them (jointly with the sections of Entomology and Veterinary Science). There were also papers on ventilation, diseases among children in New South Wales, and heredity in cancer.

Veterinary Science.—The work of this section is so interlocked with the sections of Agriculture, Entomology, and Zoology that it held no separate sessions in Melbourne, and in Sydney most of the sessions were also with those of other sections. Pleuro-pneumonia in cattle, Piroplasmoses of the Pacific region, and The control of the cattle tick were separately discussed.

Zoology.—The papers before the section of Zoology were largely of miscellaneous character. In Melbourne parasites and genetics were discussed with other sections, and fisheries and marine biological stations received independent consideration. In Sydney the geographic distribution of several groups of organisms received attention; there were papers on the evolution of the marsupials, on the evolution of mollusks concurrent with topographic development, and on the ecology of marine organisms. The preservation of the native fauna of Australia was specially considered.

In conclusion Dr. Vaughan spoke appreciatively of the general benefits of the Congress in bringing widely separated investigators into direct contact, in affording opportunity for first-hand information as to scientific progress in distant regions, and in promoting good will and mutual understanding by the assembling of men actuated by the common purpose of increasing and utilizing scientific knowledge in the improvement of human welfare.

H. E. GREGORY: *The resolutions adopted by the Congress on International Cooperation in Scientific Research.*

The resolutions adopted by the Congress of 1923 show that the delegates viewed the Pacific as a unit area, of which information in all branches of science was deficient. It was recognized that increase of knowledge in any branch is of great assistance to all other branches and that practical steps in progress are to be made by utilizing all agencies concerned—governmental, institutional, and individual. The resolutions therefore took the forms of (1) pointing out needed investigations wholly within the sphere of a single country, state, or institution, and (2) formulating projects which demand specific contributions from different sources. For some problems, for example the origin and history of the native populations, areas were delimited in which Japan, Dutch East Indies, Australia, New Zealand, and the United States are to assume responsibility.

The Congress passed resolutions designed to insure standardized methods of field recording and label making, to provide for the publication of

manuscripts, and to develop more and better university courses of instruction in subjects directly related to the Pacific.

Resolutions which are essentially outlines of projects for investigation in agriculture, anthropology, botany, entomology, forestry, geodesy, geography, geology, geophysics, hygiene, oceanography, veterinary science, and zoology, and which reveal an appreciation of the inter-relation of these subjects and a knowledge of ways and means, were spread on the records for transmission to institutions and government bureaus. Resolutions dealing with conservation are considered of particular importance, because of the urgency and human interest of the investigation which they formulate. Attention was directed to the threatened extinction of indigenous terrestrial fauna and flora and marine mammals; to the depletion of fisheries; to the relative unprofitableness of tropical agriculture because of plant diseases and insect pests; to the absence of ready communication between Pacific peoples, and especially to the alarming decrease in the native population.

That the resolutions passed at the Australian session of the Pacific Congress are likely to lead to accomplished results is indicated by the way in which the suggestions formulated in resolutions at the Honolulu meeting in 1920 have been put into effect. (*Author's abstract.*)

182d MEETING

The 182d meeting of the Academy, the 26th annual meeting, was held at the Administration Building of the Carnegie Institution of Washington the evening of Tuesday, January 8, 1924. The program consisted of an address by the retiring President, T. WAYLAND VAUGHAN, entitled, *Oceanography in its relations to other earth sciences.* This has since been published in the Journal (**14**: 307–333. August 19, 1924).

After a short intermission following the address the annual business meeting of the Academy was held. The minutes of the 25th annual meeting were read and approved. The Corresponding Secretary, FRANCIS B. SILSBEE, reported briefly on the activities of the Academy during the year 1923. On January 1, 1924, the membership consisted of 15 honorary members, 3 patrons, and 560 members, one of whom was a life member. Of the total membership of 578, those living in or near Washington number 361, those in other parts of the United States 192. There are 25 foreign members. During the year the resignations of 13 members were accepted, and the Academy lost by death the following: WILLIAM H. BABCOCK, JOHN B. HENDERSON, OTTO KLOTZ, ALFRED A. MAYOR, E. W. MORLEY, E. D. WILLIAMSON. There was, nevertheless, a slight gain in membership over the last preceding year. Nine meetings of the Board of Managers were held, one important activity being the election of nine honorary members, as follows: ERNEST CLAYTON ANDREWS, Australia (Geology); CARL FREDERICK ALBERT CHRISTENSEN, Denmark (Botany); RAOUL GAUTIER, Switzerland (Geodesy); LEON MANOUVRIER, France (Anthropology); PAUL MARCHAL, France (Biology); F. OMORI, Japan (Seismology); Sir ERNEST RUTHERFORD, England (Radioactivity); GUISEPPI STEFANINI, Italy (Paleontology); MAX WEBER, Netherlands (Zoology). Other matters considered by the Board of Managers pertained to support of the plan for a national arboretum in Washington, relief to sorely distressed scientists of foreign countries, and the proposed plan for preparing a complete and detailed history of scientific work in Washington, a project which, unfortunately, it has been necessary to postpone indefinitely. Especially noteworthy was the affiliation of three

new societies with the Academy during the year: Society of American Bacteriologists (Washington Branch), American Society of Mechanical Engineers (Washington Section), Helminthological Society of Washington. The effect of this has been to add about 350 scientists, or about 25 per cent, to those now directly affiliated with and represented by the Academy. This is the first occasion since 1912 that additional societies have become affiliated with the Academy.

The report of the Recording Secretary, WILLIAM R. MAXON, was read. In addition to the annual meeting there were held during the calendar year 9 public meetings, nearly all in conjunction with one or more of the affiliated societies, at which illustrated addresses were delivered. The titles and dates and places of publication of the addresses were stated. Besides these meetings the Academy participated in the memorial exercises held at the National Museum the evening of Saturday, February 3, 1923, celebrating the centenary of the birth of Spencer F. Baird, former Secretary of the Smithsonian Institution. Addresses on that occasion were delivered by WILLIAM H. DALL, C. G. ABBOT, EDWIN LINTON, DAVID STARR JORDAN, and C. HART MERRIAM, all, with a single exception, members of the Academy.

The report of the Treasurer, R. L. FARIS, showed total receipts of $5,307.12 and total disbursements of $6,190.09; the cash balance in hand December 31, 1923, was $1,788.50. Investments of the Academy have a total par value of $16,036.37. The cost of maintaining and printing the Journal in 1923 was approximately $3,700, a slight increase over 1922.

The report of the Auditing Committee was read and the reports of both the Treasurer and the Auditing Committee were accepted.

The report of the Editors of the Journal was read by SIDNEY PAIGE, the senior Editor. The editorial policy of the Board had remained essentially unchanged. Volume 13, for 1923, consists of 465 pages and includes 58 original articles, as against 486 pages and 52 original articles published in 1922. The cost of printing was slightly less per page than in 1922. Reference was made also to a definite provision adopted by the Board of Managers by which the Academy shares with authors the cost of illustrations, and by which authors' reprints may be purchased at a much lower price than that charged by the publishers. With deep regret the Editors recorded the death of E. D. WILLIAMSON, a member of the Editorial Board.

The committee of Tellers reported that the following officers had been elected for 1924: *President*, A. L. DAY; *Non-resident Vice-Presidents*, IRA REMSEN, W. E. RITTER; *Corresponding Secretary*, F. B. SILSBEE; *Recording Secretary*, W. D. LAMBERT; *Treasurer*, R. L. FARIS; *Managers, Class of 1927*, F. G. COTTRELL, V. KELLOGG.

The following Vice-Presidents, nominated by the affiliated societies, were then elected: *Anthropological Society*, T. MICHELSON; *Archaeological Society*, WALTER HOUGH; *Society of American Bacteriologists (Washington Branch)*, W. M. CLARK; *Biological Society*, J. W. GIDLEY; *Botanical Society*, L. C. CORBETT; *Chemical Society*, R. S. MCBRIDE; *Institute of Electrical Engineers*, A. R. CHEYNEY; *Society of Engineers*, M. C. GROVER; *American Society of Mechanical Engineers (Washington Section)*, O. P. HOOD; *Entomological Society*, S. A. ROHWER; *Society of Foresters*, G. B. SUDWORTH; *National Geographic Society*, FREDERICK V. COVILLE; *Geological Society*, G. F. LOUGHLIN; *Helminthological Society of Washington*, B. H. RANSOM; *Historical Society*, ALLEN C. CLARK; *Medical Society*, JOHN D. THOMAS; *Philosophical Society*, D. L. HAZARD.

At 10:15 the meeting adjourned.

WILLIAM R. MAXON, *Recording Secretary.*

PHILOSOPHICAL SOCIETY

905TH MEETING

The 905th meeting was held in the Auditorium of the Cosmos Club on Saturday, October 4, 1924. The meeting was called to order at 8:15 P. M. by President HAZARD with 50 persons in attendance.

The program of the evening consisted in reports from the meetings of the British Association and the International Mathematical Congress, held in Toronto during August 1924.

W. J. HUMPHREYS reported upon that part of the program which dealt with geophysics, including, particularly, meteorology, magnetism, and seismology.

H. L. CURTIS reported upon that part of the program which was concerned with general physics, describing in detail also some of the entertainment features and excursions.

PAUL D. FOOTE reported upon that part of the program which dealt with atomic physics, detailing particularly the papers by Compton and Duane.

E. W. WOOLARD reported upon the meetings of the International Mathematical Congress, discussing the papers under the headings of pure and applied mathematics.

The reports were discussed by F. B. SILSBEE.

906TH MEETING

The 906th meeting was held in the Auditorium of the Cosmos Club on Saturday, October 18, 1924. The meeting was called to order at 8:15 P. M. by President HAZARD with 50 persons in attendance.

The first paper on the program was presented by O. H. GISH on *Preliminary results of earth-current measurements at Watheroo, Western Australia.* The paper was illustrated with lantern slides and was discussed by Messrs. MARMER, MAUCHLY, TUCKERMAN, BREIT, and CROOKER.

The first continuous recording of earth-current potentials in the Southern Hemisphere was begun in October, 1923, at the Watheroo Magnetic Observatory of the Carnegie Institution of Washington near Watheroo, Western Australia. The method used was previously described (see THIS JOURNAL **14**: 120. 1924). Curves of the diurnal variation for the months of November and December, 1923, show pronounced characteristics as follows: The South-North component is a double wave which when plotted on local time is in phase with the South-North component of diurnal variations in earth-currents observed at Berlin (1884–1888) and Ebro (1914–1918). The West-East component of the diurnal variation at Watheroo, however, is approximately a single wave, while at Berlin and Ebro a double wave is obtained for this component. This single wave is in phase with the principal harmonic of the curve obtained at the other stations. The amplitudes observed at Berlin are expressed in arbitrary units and consequently can not be used in a comparison. At Ebro, however, the amplitude of either component is 20 times that found thus far at Watheroo, the range in values at Watheroo being as follows: South-North component, 1.6 millivolts per kilometer; West-East component, 0.6 millivolts per kilometer. The vector diagrams of the diurnal variations at Watheroo are of similar character to those obtained at both Ebro and Berlin. These diagrams are elongated along a line extending from west of north to east of south, and on the day-light portion the progression is clockwise. Though too early to draw definite

conclusions, these results do not appear to fit in to any existing theory. (*Author's abstract.*)

A paper on *Graphical solution of spherical triangles* was presented by F. E. WRIGHT. It was illustrated with lantern slides and was discussed by Messrs. LITTLEHALES, TUCKERMAN, HAWKESWORTH, and HUMPHREYS. The paper was published in full in the Journal of the Washington Academy of Sciences for October 19, 1924.

W. D. LAMBERT presented the third paper on the program on *The distance between two points on the Earth.* The paper was discussed by Messrs. O. S. ADAMS, L. H. ADAMS, GARDNER, HAYFORD, GISH, WRIGHT, and HAWKESWORTH.

The problem of finding the latitude and longitude of a point given by its distance and direction from a point of known latitude and longitude is called "the principal geodetic problem." The problem in hand is the inverse of this, the two points being assumed to be given by their geographic coordinates. Many solutions of these two problems have been given to meet various conditions of distance, accuracy, or convenience in computation. When the flattening of the earth is allowed for, there are various connecting lines which might be used, but the most natural one is the shortest, or geodesic, line.

The complete solution for the geodesic was given in 1825 by Bessel in the Astronomische Nachrichten (Vol. 4). It involves elliptic integrals, and is decidedly laborious in spite of auxiliary tables. Associated with the spheroidal triangle, the vertices of which are a pole of the earth and the two points, there is a spherical triangle somewhat resembling the spheroidal one and related to it in certain rather simple ways.

The spherical triangle should be conceived as a convenient geometrical representation of certain quantities occurring in the computation rather than as a deformation or projection of the spheroidal triangle. The rigorous solution involves successive approximations, each approximation requiring the solution of spherical triangles. If, however, too great accuracy is not demanded, the solution may be found by applying to the first approximation certain small corrections deduced from the differential variations of the parts of a triangle. This is done in the proposed approximate solution. This approximate solution is so accurate that, regardless of the distance between points, a computation with five-figure tables will not distinguish with certainty between the approximate and the exact processes, and often a computation with six figures is no more than sufficient for the purpose. (*Author's abstract.*)

W. J. HUMPHREYS presented, as an informal communication, a report as delegate from the Philosophical Society of Washington to the Centenary Celebration of the Franklin Institute at Philadelphia.

907TH MEETING

The 907th meeting was a joint meeting with the Washington Academy of Sciences and was held in the Auditorium of the Cosmos Club on Saturday, November 1, 1924.

The meeting was called to order at 8:18 P. M., by President A. L. DAY, of the ACADEMY, with 95 persons present.

Dr. HENRY NORRIS RUSSELL of Princeton University addressed the meeting on *Recent advances in our knowledge of the interior of the stars.*

All our direct knowledge of the stars deals with their surfaces. We can now find not only their distances and brightness, but their diameters, and temperatures; that is, their surface temperatures. The largest stars are red and relatively cool; those of intermediate size are white, and hot; the smallest ones ("dwarf stars") are again red, with few exceptions. These facts fit in with the scheme of stellar evolution proposed by Lane and Lockyer, and revised by the speaker, according to which a mass of gas contracting under its gravitation will get hotter, both at the center and (more slowly) on the surface till its density becomes so high that the atoms are crowded close together, when the temperature falls again.

The cooler stars show mainly the spectral lines of the metals; the hotter, those of the permanent gases. Saha and others have explained this on the theory of ionization. When a metallic atom loses an electron it absorbs a new set of lines—the spark lines. After losing from two to four, it no longer absorbs anything in the visible spectrum. This happens at the higher stellar temperatures. The permanent gases are much harder to ionize, and demand these high temperatures even to get their atoms into the "excited" state in which they absorb lines in the visible region (instead of the ultra-violet). The spectral differences are therefore no evidence of transmutation of elements.

In the interior of the stars the temperature must be many millions of degrees. Under these conditions the lighter atoms (about as far as sodium) would lose all their electrons, and be reduced to bare nuclei. The heavier ones would retain a few of the inner electrons. Even here, no general transmutation occurs; if the gas cooled down, the original atoms would automatically be reconstituted.

Eddington has shown that the enormous gravitational pressure is supported partly by the gas pressure due to the motion of atoms and electrons and partly by the pressure of the imprisoned radiation. If the mass of the body is less than one-tenth that of the sun, the radiation pressure has an insignificant share. Such bodies can not shine brightly enough to be seen at great distances—which explains why there are no stars of mass smaller than this. The amount of light which leaks out to the surface of a star depends on the opacity of the internal material. The first form of Eddington's theory made this opacity constant, and ascribed the low luminosity of the dwarf stars to low internal temperature resulting from close packing of the atoms. Later work leads to an opacity increasing with the density, and to internal temperatures higher for the dwarfs than for the giants—the increased opacity of the former preventing much escape of heat to the surface.

This demands that the stellar material should behave practically like a perfect gas, up to at least 100 times the density of water. The nuclei, and highly ionized residues of atoms inside the stars, are so much smaller than normal atoms that this is entirely reasonable.

A few of the dwarf stars are white, and probably of great surface brightness, small diameter, and high density.

The computed density for the comparison of Sirius is about 50,000 times that of water. Even this enormous density is no longer incredible, and the interpretation of these white dwarfs—previously a hopeless puzzle—is one of the notable triumphs of the new theory. (*Author's abstract.*)

908TH MEETING

The 908th meeting was a joint meeting with the Washington Academy of Sciences and was held in the Auditorium of the Cosmos Club on Saturday, November 15, 1924.

The meeting was called to order at 8:17 P. M. by D. L. HAZARD, President of the Philosophical Society, with 80 persons present.

President Hazard announced that the Committee on Elections would receive nominations for officers of the Philosophical Society for the coming year.

The address of the evening was delivered by Prof. CH. FABRY of Paris on the subject *Thirty years of spectroscopy with the interferometer.*

The address was termed by Prof. Fabry a scientific autobiography, and the origin of interference fringes and their applications were discussed. Views illustrating the first fringes obtained as well as some of the early apparatus used were shown.

The address was discussed by Messrs. SOSMAN, BURGESS, and SKINNER.

J. P. AULT, *Recording Secretary.*

SCIENTIFIC NOTES AND NEWS

At the Annual Meeting of the Board of Regents of the Smithsonian Institution the Secretary announced the appointment of Senators SMOOT and PEPPER to fill the vacancies on the Board caused by the death of Senator Lodge and the resignation of Senator McCormick.

Dr. WILLIAM M. MANN returned recently from an extended trip, in the interests of the Federal Horticultural Board, to southern Europe where he investigated the distribution of the Mediterranean fruit fly.

A meeting of the Petrologist's Club was held at the home of H. G. FERGUSON on December 16. M. I. GOLDMAN described *An instance of syngenetic solution and epigenetic flowage in limestones, and observations on silicification.* There was also further discussion of SHANNON and ROSS's paper on *Bentonite,* presented at the preceding meeting. Officers for 1925 were elected as follows: *Secretary,* EDWARD SAMPSON; *Governing Committee,* H. G. FERGUSON, J. M. MERTIE, H. E. MERWIN.

The December meeting of the Pick and Hammer Club, held at the Geological Survey on December 6, was devoted in part to an informal memorial and tribute to the late ALFRED H. BROOKS, chief of the Alaska Branch of the Survey. Among the speakers were SIDNEY PAIGE, GLENN S. SMITH, A. C. SPENCER, C. E. MENDENHALL, R. H. SARGENT, and G. O. SMITH. The regular program of the meeting consisted of reports on the work of the past field season, made by N. C. GROVER for the Hydrographic Branch, GLENN S. SMITH for the Topographic Branch, G. R. MANSFIELD for the Geologic Branch, J. D. NORTHRUP for the Land Classification Board, and S. R. CAPPS for the Alaska Branch.